

APPLICANT(S): LI, Yingxue et al.
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REMARKS

The present response is intended to be fully responsive to all points of objection and/or rejection raised by the Examiner and is believed to place the application in condition for allowance. Favorable reconsideration and allowance of the application is respectfully requested.

Applicants assert that the present invention is new, non-obvious and useful. Prompt consideration and allowance of the claims is respectfully requested.

Status of Claims

Claims **1-35** are pending in the application.

Claims **28** and **29** have been allowed.

Claims **1-15**, **19-21** and **25-27** have been rejected.

Claims **16-18** and **22-24** have been objected to.

Claims **30-35** have been newly added in this submission.

Allowable Subject Matter

In the Office Action, the Examiner stated that claims 16-18 and 22-24 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims. Applicants respectfully decline at this time to make such amendments. As explained below, it is respectfully submitted that all claims are allowable over the cited art.

CLAIM REJECTIONS

35 U.S.C. § 103 Rejections

In the Office Action, the Examiner rejected claims 1-15, 19-21 and 25-27 under 35 U.S.C. § 103(a), as being unpatentable over Eltawil (US Patent Application Publication No. 2003/0142726) in view of Sourour (US Patent No. 6,810,070). Applicants respectfully traverse the rejection based at least on the below.

The Eltawil reference, entitled Universal Rake Receiver discloses:

A universal rake receiver architecture includes modular independent processing units that can be flexibly programmed to support different modes of operation. The processing units are capable of performing the basic correlation calculations of DS-CDMA and each unit has an internal local memory and controller that controls its mode of operation. Each unit performs the required synchronization and demodulation operations for a multipath of a signal in the digital domain using all-digital frequency and timing correction techniques. Frequency feedback need not be supplied to the analog section of the receiver. Interpolation most preferably is used to find the optimum sampling position of each incoming chip. This independence allows the receiver to be used with one to several antennas without design modifications. (Abstract, emphasis added)

In particular, as pointed out by the Examiner, the Eltawil reference states “each rake finger usually includes the ability to track the timing of a received multipath signal and to adjust the rake finger's timing for data recovery as the delay of the assigned multipath varies.” (Eltawil, para. [0014]). Therefore, the timing modules associated with each rake finger synchronizes receipt of the signals, at which point the signals are provided to a summer.

In contrast, pending claim 1 recites “applying a delay to at least one of the plurality of diversity signals, the delay being less than one chip duration; and processing the plurality of diversity signals using the delay to obtain the information, the delay operable to allow at least two diversity signals associated with the downlink signal to be distinguishable.”

Thus, the Eltawil reference does not disclose applying a delay to individual receive path in any rake finger operable to allow at least two signals to be distinguishable. Nor would introducing a delay in a rake finger have been obvious, because the intent of the Eltawil reference is precisely the opposite – i.e., to synchronize the signals. Eltawil therefore

teaches away from introducing a delay operable to allow at least two diversity signals associated with the downlink signal to be distinguishable.

Indeed, it will further be noted that some embodiments of the present invention may be used in conjunction with a rake receiver, for example, by providing distinguishable signals that may then be input to rake fingers and processed accordingly.

The Sourour reference does not teach introducing a delay in order to render two signals distinguishable. Sourour in fact teaches an entirely different solution to distinguishing signals:

Also, if multipath diversity cannot be obtained because, for example, the delay spread of the signal is less than the chip duration, it may be desirable to use multiple carriers to implement frequency diversity as a proxy for multipath diversity. By way of example, assume a DS-SS MC CDMA signal configuration similar to the one shown in FIG. 1, with $N=1$. To obtain frequency diversity, it is desirable to have enough carriers ($S_{sub.1} = M$) such that the number of paths per carrier $L=1$. In this case, frequency diversity is maintained since the same bit is transmitted on all carriers. With $L=1$ and orthogonal codes, there is no multipath or multi-user interference. If there are not enough carriers to reach the condition of $L=1$, then the maximum number of carriers is used to minimize the number of paths L and hence minimize multipath and multi-user interference. Diversity is obtained through frequency diversity instead of multipath diversity. (col. 9 lines 11-25, emphasis added)

Thus, while the Sourour reference identifies lack of multipath diversity due to small delay, the solution is to obtain diversity through frequency diversity instead of multipath diversity. However, that is not the claimed solution. Sourour, therefore, does not disclose “applying a delay to at least one of the plurality of diversity signals, the delay being less than one chip duration; and processing the plurality of diversity signals using the delay to obtain the information, the delay operable to allow at least two diversity signals associated with the downlink signal to be distinguishable,” as recited in claim 1.

Therefore, claim 1 is allowable over the art of record, as are claims 2-6, which depend therefrom. Claim 7 is allowable for similar reasons, as are claims 8-13, which depend therefrom. Claim 26 is likewise allowable.

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Regarding claim 14, neither Eltawil nor Sourour discloses a method of transmission. Claim 14, in contrast, discloses receiving a signal at a splitter, applying at least one delay, and transmitting the plurality of transmit diversity signals at a plurality of antennas. This is neither disclosed nor obvious based on the cited Eltawil and Sourour references. Therefore, claim 14, as well as claims 15 and 19 are allowable. For similar reasons, claims 20 and 21 and 25, and claim 27, are allowable over Eltawil and Sourour.

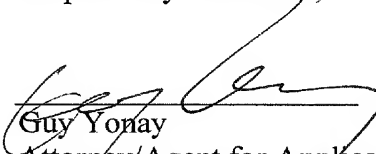
Claims 30-35 have been newly added to further define the subject matter of the present invention by reciting that the applied delay may be between approximately 0.5 and one chip duration. It is noted that support for this amendment may be found throughout the specification, for example, at para. [0008] of the application as published. Eltawil does not teach applying a delay of between approximately 0.5 and one chip duration.

In view of the foregoing amendments and remarks, the pending claims are deemed to be allowable. Their favorable reconsideration and allowance is respectfully requested.

Should the Examiner have any question or comment as to the form, content or entry of this Amendment, the Examiner is requested to contact the undersigned at the telephone number below. Similarly, if there are any further issues yet to be resolved to advance the prosecution of this application to issue, the Examiner is requested to telephone the undersigned counsel.

Please charge any fees associated with this paper to deposit account No. 50-3355.

Respectfully submitted,


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